REMARKS

In the Office Action of January 26, 2011, the Examiner objected to claims 1,3, and 7; rejected claims 1, 3, and 7 under 35 U.S.C. § 112, first paragraph; rejected claims 1, 2[1], 4, and 6 under 35 U.S.C. § 103(a) and being unpatentable over U.S. Patent Publication No. 2002/0128052 to Neagley et al ("Neagley") in view of Potentials, IEEE Volume 18, Issue 4, Oct-Nov 1999, pages 29-33 ("NPL"), and rejected claims 7 and 8 as being unpatentable over U.S. Patent No. 6,509,836 to Ingram "Ingram" in view of NPL, further in view of U.S. Patent No. 4,499,594 to Lewinter "Lewinter "and further in view of Neagley.

Claim Objections

The Examiner objected to the language "switching the phase of the return signal between two reflection states." In order toexpediate prosecution, Applicant has amended claims 1 and 7 to clarify this claim language.

Rejection under 35 U.S.C. § 112, first paragraph

The Examiner rejects claims 1, 3, and 7 under 35 U.S.C. § 112, first paragraph. Applicant respectfully traverses for at least the following reasons.

Before rejecting a claim as failing to comply with the enablement requirement, the Office must determine whether undue experimentation is needed. To determine whether the necessary experimentation is undue, the Office must at least rely on all eight (8) of the *Wands* factors laid out in MPEP § 2164.01(a). In addition, the Office's analysis must consider all the evidence related to each of the *Wands* factors, and any conclusion of nonenablement must be based on the evidence as a whole (See MPEP § 2164.01(a)).

Applicant respectfully disagrees with the Examiner's conclusion that the claimed invention is not possible. The Examiner states that, "[w]hen the antenna is grounded when 0 or -1 is to be transmitted, all the signal received by the antenna will be grounded and no signal will be reflected." See Office Action, page 4. A grounded antenna is equivalent to a "shorted" (e.g., zero impedance) antenna. For a radio frequency signal not to be reflected, the proper matched-impedance load must exist between the

[1] The rejection of claim 2 appears to be an error as claim 2 was previously canceled.

terminals of the antenna. For a shorted condition, the RF energy received by an antenna is reflected.

Figure 5 uses the ground symbol in the context of chassis ground as opposed to earth ground. The chassis ground is the shielding or outer conduction of the coaxial connector. This connector is post the antenna's transition from waveguide or similar to coax.

The intent of Figure 5 is to illustrate how the amount of reflected energy can be controlled by switching in and out power splitters with matched loads. The energy that goes to the side of the power splitter with a matched load will be absorbed and thus will not be reflected back. Energy that connects with short or open state will reflect back. Therefore the claimed language is described in such a way that one of ordinary skill in the art would be able to make/use the invention, and claims 1, 3, and 7 should be allowed.

Rejection under 35 U.S.C. § 103(a)

The Examiner rejects claims 1, 2, 4, and 6 under 35 U.S.C. § 103(a) as being allegedly unpatentable over the combination of Neagley and NPL. Office Action at 8. The Examiner rejects claims 7 and 8 under 35 U.S.C. § 103(a) as being allegedly unpatentable over the combination of Ingram, NPL, Lewinter, and Neagley. Office Action at 12. Applicant respectfully traverses for at least the following reasons.

With respect to obviousness, several basic factual inquiries must be made in order to determine the obviousness or non-obviousness of claims under 35 U.S.C. § 103. These factual inquiries, set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 17, 148 U.S.P.Q. 459, 467 (1966), require the Examiner to:

(1) Determine the scope and content of prior art;

(2) Ascertain the differences between the prior art and the claims in issue;

(3) Resolve the level of ordinary skill in the pertinent art; and

(4) Evaluate evidence of secondary considerations.

The obviousness or non-obviousness of the claimed invention is then evaluated in view of the results of these inquiries. *Graham*, 383 U.S. at 17-18, 148 U.S.P.Q. at 467; *see also KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1730, 82 U.S.P.Q.2d 1385, 1388 (2007).

Indeed, to establish a *prima facie* case of obviousness, the examiner must:

> make a determination whether the claimed invention "as a whole" would have been obvious at that time to that person. Knowledge of applicant's disclosure must be put aside in reaching this determination, yet kept in mind in order to determine the "differences," conduct the search and evaluate the "subject matter as a whole" of the invention.

M.P.E.P. § 2142, 8th Ed., Rev. 6 (Sept. 2007). "The key to supporting any rejection under 35 U.S.C. § 103 is the clear articulation of the reason(s) why the claimed invention would have been obvious." *Id.* It is important to note, moreover, that the prior art references relied upon in a rejection "must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention," when such reasons are articulated by the Examiner. *Graham*, 383 U.S. at 17, 148 U.S.P.Q. at 467; *See also* M.P.E.P. § 2141.03(VI) (emphasis added).

Applicant respectfully submits that such reasons are not present in the rejection of record at least because the references relied upon by the Examiner, when considered as a whole, do not show all of the claimed limitations, nor do they provide any reason that would have prompted a person of ordinary skill in the art to modify and combine the references in the manner suggested by the Examiner.

In response to applicant's previous arguments that the references fail to show certain features of applicant's invention, the Examiner states that "the features upon which applicant relies a BPSK modulation and BPSK signal is placed upon a subcarrier are not recited in the rejected claims." Office Action at 6. While Applicant believes that the previous claim encompass these limitations for the purposes of expediting prosecution Applicant proposes to amend the claims to more specifically claim the above-identified features. Applicant amended claims 1 and 7 to add "switching the phase of a return signal received from a modulated reflectance apparatus between two reflection states" and amended claims 2 and 8 to add the following limitation: "a subcarrier, wherein the subcarrier is created by switching the impedance between two reflective states."

As discussed below, the cited references do not show switching between two reflection states or a subcarrier. The modulation proposed in the pending claims

switches between to maximum reflectivity states, 1) an "open" (very high impedance – near infinity) and 2) a "short" (very low impedance – near zero). These two states reflect the phase of the impinging electromagnetic field in two different ways. An "open" circuit termination will cause a 180 degree phase shift in the reflected signal. A "short" circuit termination will maintain the same phase orientation as the impinging electromagnetic field. This phase changing property is used to form the binary alphabet. This form of modulation is Binary Phase shift keying (BPSK), where the phase of the return signal is switching between two anti-polar phases. BPSK modulation requires 3 dB less in power level than FSK modulation to demodulate and is also superior to OOK. BPSK modulation needs the least signal-to-noise ratio for demodulation than the other two forms of modulations discussed in previous work. It is not obvious to one of ordinary skill in the art how to implement BPSK modulation for a modulated reflector.

In addition, as defined in the pending claims, the BPSK signal is placed upon a subcarrier. The subcarrier is created by switching the impedance between the two highly reflective states of different phase return. Figure 3 of the pending application shows the method to create the subcarrier BPSK signal using a square-wave generator and multiplying the square-wave signal against a bipolar data stream. This results in a square wave at a single frequency that may or may not change phase for M cycles. Thus M cycles of the square wave maybe in one phase and the next M cycles could be at the same or different phase. A single cycle of a square wave will cause numerous cycle of the interrogating electromagnetic wave to be reflected first in one phase and then 180 degrees opposite in phase. The phase transitions marks a single cycle of square wave. If the phase transition does not occur at a time corresponding to one square wave cycle, then the phase of the square wave was changed and the binary symbol has changed.

The subcarrier BPSK signal allows for multiple uses of the modulated reflector technology. First a signal transmitter/receiver would be able to interrogate multiple modulated reflectors given that each modulated reflector had a different subcarrier frequency. Furthermore, by using code division multiplexing, modulated reflectors with the same subcarrier frequency can be separated.

Ingram discusses modulation control and that Code Division Multiplexing can be used but does not discuss how to achieve phase modulation with a modulated reflector. The diagram, Figure 2A, in the document depicts a reflective and absorptive modulation for the impedance. The discussed "open" and "closed" states refer to the switch used to modulate the reflectance and not the "open" and "short" circuits of the modulated reflector impedance.

To further illustrate the arguments above, an example is shown. The three plots below depict the generation of a modulated reflective wave using BPSK modulation. Figure 1 illustrates the interrogation wave that impinges upon the modulated reflector. The interrogating wave is a sinusoidal carrier of a single frequency. The frequency of the interrogating wave is higher than that of the data rate.

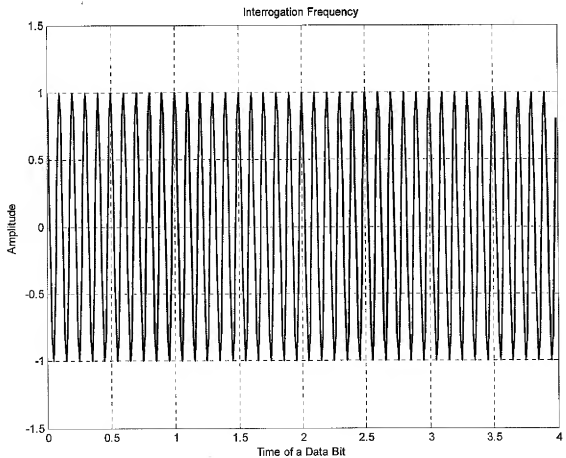

Figure 1: Interrogation Waveform

The data is composed of a binary number sequence. Below in Figure 2 is a representation of this binary number sequence.

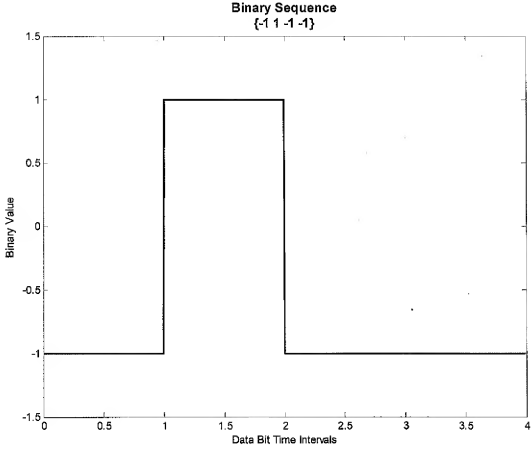

Figure 2: Binary Number Sequence

If the binary sequence is used to modulate just the interrogating frequency of the modulated reflector then the reflector switches between the two maximum reflectivity states, open and short, in accordance to the binary sequence value. Figure 3 illustrates the reflected waveform with the interrogation frequency possessing a BPSK modulation.

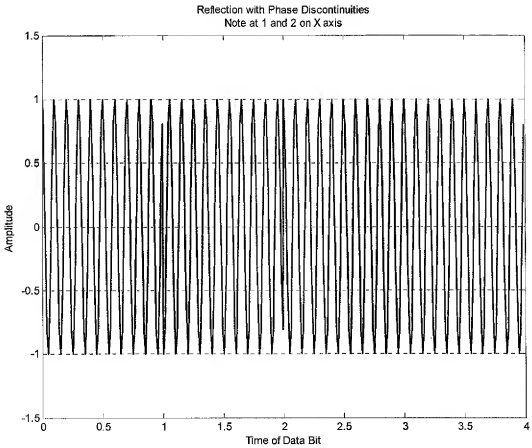

Figure 3: Interrogation frequency BPSK modulated

However, this limits the interrogator part of the system only retrieving information from one modulated reflector. By switching between the two states a subcarrier can be added to the reflected waveform. It is desirable to have subcarriers because multiple modulated reflectors can be illuminated by a single interrogator/information receiver yielding multiple information streams being conveyed to the interrogator/information receiver.

As claimed in the pending application, the subcarriers can be BPSK modulated. It is desirable to have the subcarriers modulated with BPSK, rather than FSK because of the improvement in signal-to-noise ration. The method that BPSK modulation is impart on the subcarriers is by changing the phase of the switch that imparts the subcarrier. This is shown in Figure 4 below. The phase transitions can be seen at Symbol times 1 and 2.

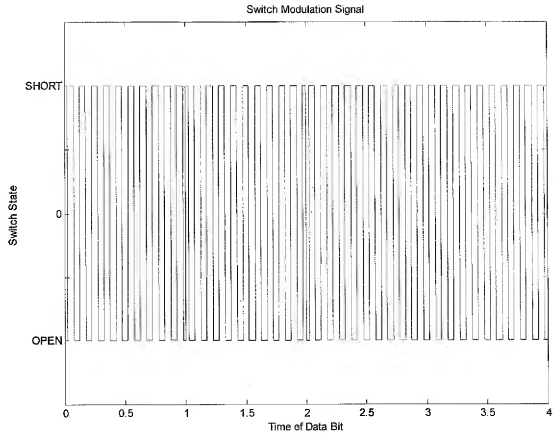

Figure 4: PBSK Modulation

Dependent claims 3 and 6 depend from independent claims 1 and 4 respectively and therefore, are allowable for at least the reasons discussed above and in view of their additional recitations of novel subject matter.

In view of the foregoing remarks, Applicant submits that this claimed invention, as amended, is neither anticipated nor rendered obvious in view of the prior art references cited against this application. Applicant therefore requests the Examiner's reconsideration and reexamination of the application, and the timely allowance of the pending claims.

Respectfully submitted,

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